

HOSTED BY



Contents lists available at ScienceDirect

Journal of the Egyptian Society of Cardio-Thoracic Surgery

journal homepage: <http://www.journals.elsevier.com/journal-of-the-egyptian-society-of-cardio-thoracic-surgery/>

Evaluation of the role of bedside ultrasonography in the detection of traumatic occult pneumothorax

Heba Ezzat ^a, Mohamed Elkahwagy ^{b, *}, Mohamed Eltomay ^c, Mohab Sabry ^b

^a Emergency Medicine and Traumatology Department, Faculty of Medicine, Tanta University, Egypt

^b Cardio-Thoracic Surgery Department, Faculty of Medicine, Tanta University, Egypt

^c Diagnostic Radiology Department, Faculty of Medicine, Tanta University, Egypt

ARTICLE INFO

Article history:

Received 9 April 2018

Received in revised form 24 April 2018

Accepted 29 April 2018

Available online 12 May 2018

Keywords:

Pneumothorax

Occult pneumothorax

Thoracic ultrasonography

Chest trauma

A B S T R A C T

Background: Primary management of pneumothorax is usually as simple as it can be done by junior physician. But diagnosis of pneumothorax is sometimes as difficult as it can be missed by senior physician and lead to serious complications that may endanger the patient's life.

Methods: This study was conducted on 80 polytraumatized adult patients, within the same day of trauma. They presented to the Emergency Department, Tanta University, Egypt with chest trauma in the period between October 2016 to the end of January 2018. All patients were subjected to chest X-ray either erect position when possible or supine position revealing no pneumothorax. Subsequently, all of those patients underwent thoracic ultrasonography prior to whole body CT scanning performed within 2 h of admission.

Results: Ultrasonography detected pneumothorax in 56 out of 62 patients having occult pneumothorax with sensitivity up to 90.32% and positive predictive value of 96.55%. On the other hand, ultrasonography succeeded in exclusion of occult pneumothorax in 16 out of 18 patients that were free of occult pneumothorax in their CT with specificity reaching 88.89% and negative predictive value of 72.73%, the overall accuracy was calculated to be 90%.

Conclusions: Bedside thoracic ultrasonography is a simple, rapid and reliable tool with high sensitivity, specificity and accuracy that can be depend on for diagnosis of occult pneumothorax in chest trauma patients.

© 2018 Publishing services by Elsevier B.V. on behalf of The Egyptian Society of Cardio-thoracic Surgery. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

The term “pneumothorax” was first used by the French physician Jean Marc Gaspard Itard, a student of Laennec in 1803 [1].

Primary management of pneumothorax (PTX) is usually as simple as it can be done by junior physician but diagnosis of pneumothorax is sometimes as difficult as it can be missed by senior physician and lead to serious complications that may endanger life of the patient.

* Corresponding author. Cardio-Thoracic surgery department, Faculty of Medicine, Tanta University, Egypt.

E-mail addresses: m_elkahwagy2005@hotmail.com (M. Elkahwagy), mohab_sabry@hotmail.com (M. Sabry).

Peer review under responsibility of The Egyptian Society of Cardio-thoracic Surgery.

Primary survey for trauma patient includes chest X ray and it is usually the main investigation for detection of pneumothorax but with the improvement of radiological methods and introduction of chest computed tomography (CT) as an available tool for diagnosis it was shown to be more accurate [2].

Occult pneumothorax (OPTX) is a pneumothorax that is diagnosed by CT scan of the chest without previous identification or clinical suspicion by traditional chest X ray and its current prevalence stands at 2%–15% [3].

The significance of early detection of OPTX arise from there is chance of clinical deterioration in those cases by progression into a tension pneumothorax. Positive pressure ventilation in those patients increases the risk of tension pneumothorax. The management of OPTX is still controversial [4].

OPTX could be classified according to CT chest findings into small, moderate, or large. Small OPTX was equal or less than 10 mm thick with a height equal or less than 40 mm. Moderate OPTX was more than 10 mm thick with a height more than 40 mm but did not extend posterior to the midthoracic coronal line. Large OPTX was more than 10 mm thick with a height more than 40 mm (seen on 4 or more contiguous 10-mm CT slices) and extended posterior to the midthoracic coronal line [5].

Ultrasound had been used in a wide variety of specialties and had great improvement in the last decade as it always available in emergency department and ultrasound machines had become more compact and portable. Ultrasound was first used to diagnose pneumothorax in humans in 1987 [6,7].

The aim of the study was to evaluate the role of bedside thoracic ultrasonography (U/S) for detection of occult pneumothorax in patients with chest trauma.

2. Patients and methods

2.1. Study population and eligibility

This study was conducted on 80 polytraumatized adult patients (more than 18 years) recently (within the same day of trauma) presented to the Emergency Department, Tanta University Hospitals, Egypt with chest trauma in the period between October 2016 to the end of January 2018. Patients having chest wall skin loss or subcutaneous emphysema or morbid obesity (BMI more than 40) preventing adequate ultrasound evaluation were excluded as well as those having preexisting pulmonary conditions such as pulmonary surgery or chronic lung disease. Moreover, patients with haemodynamic instability hindering transportation and endangering the life were excluded. Chest X ray on admission showed no obvious signs of pneumothorax.

2.2. Methods

All of those 80 patients enrolled in the study were subjected to chest X-ray either in erect position (when possible) or supine position revealing no pneumothorax. Subsequently, all of those patients underwent thoracic U/S examination using Digital Ultrasonic Imaging System Model Phillips Affiniti 50G and portable Mindray dp20 prior to whole body CT scanning performed by Toshiba Alicon 16 slice within 2 h of admission.

The characteristic ultrasonographic features for detection of pneumothorax in this study were: absence of lung sliding, absence of B lines and identification of the lung point on 2D and M-mode ultrasonography [8].

OPTX distribution was described by patient side (unilateral or bilateral), as well as by location in the hemithorax into apical (superior to the manubrium or first rib), basal (touching the diaphragm), medial (crossing the mid-coronal line medial to the lung parenchyma) and lateral (crossing the midcoronal line lateral to the lung parenchyma) [9].

2.3. Statistical analysis

Statistical presentation and analysis of the present study was conducted using the mean, standard deviation (SD), student's T test (*t*-test), Chi-square (X^2), analysis of variance (ANOVA), and Roc curve tests.

A probability value (P value) less than 0.05 was considered statistically significant. All statistical calculations were done using SPSS (Statistical Package for Social Science "SPSS" for IBM, USA) version 23 for Microsoft Windows.

3. Results

This prospective study was conducted on 80 polytraumatized adult patients admitted consequently to Tanta University Hospital, Egypt.

Table 1 summarizes socio-demographic data of the study population and associated comorbidities or other body injuries. All of those patients were subjected to chest X ray on admission revealing no pneumothorax but subsequent thoracic CT scan detected OPTX in 62 patients (77.5%).

Table 2 shows details of CT findings in the study patients.

Chest U/S was performed for all patients of the study. The main three signs for diagnosis of pneumothorax by ultrasound were absent lung sliding, absent B lines, and visualizing lung point. To summarize, only 16 patients were negative for OPTX by both CT and U/S, 56 patients were positive for OPTX by both techniques, 2 patients were positive by U/S and negative by CT and 6 patients were negative by U/S and positive by CT (Total 80 patients).

Download English Version:

<https://daneshyari.com/en/article/8668567>

Download Persian Version:

<https://daneshyari.com/article/8668567>

[Daneshyari.com](https://daneshyari.com)